

Remarks

The Applicants thank the Examiner for the courtesy shown during the telephonic interview on March 23, 2005. Various distinctions between the invention and the subject matter of Clark (U.S. Pat. No. 6,589,382) and Boudreau (U.S. Pat. No. 4,915,057) were discussed. In accordance with the discussion during the interview, it is believed that the foregoing amendments more clearly define the invention and distinguish it over the references cited.

Independent Claim 11 has been rejected over the theoretical combination of Boudreau, Tang (U.S. Pat. No. 5,904,961) and Duggal (U.S. Pat. Appl. Pub. No. 2002/0190661). (The filing date of the Duggal publication and the subject matter of its parent (U.S. Pat. No. 6,800,999) were also discussed during the interview.)

Boudreau shows and describes an apparatus for registration of shadow masked thin-film patterns. The apparatus includes a mask assembly 20 engaged between a mask frame 14 and a mask holder frame 26. This assembly is described as a mask holder 12 and is associated with a substrate carrier 30 for depositing a thin film structure. Fig. 1 shows a single mask assembly 20 mounted to mask frame 14 with frame pins 17. The mask holder frame 26 is attached to the mask frame 14 to complete the mask holder 12.

Alignment of the mask is performed in a two step process during engagement of the assembled mask holder 12 with a substrate carrier 30. First, rough alignment is performed by engagement of primary datum pins 28 with primary apertures 34 provided in the substrate carrier 30. Thereafter, fine alignment of the mask is performed as secondary datum pins 36 engage with apertures 24 in the mask assembly 20. It is noteworthy that both alignment steps are performed concurrently with the engagement of the mask holder 12 and substrate carrier 30.

Moreover, the rough alignment step is used to align the entire mask holder assembly 12 with the substrate carrier 30. There is no alignment of an individual mask assembly 20 relative

to the mask frame 14 (or relative to the substrate) achieved during the rough alignment step. Thus, individual alignment of the mask assembly 20 relative to the mask frame 14 does not occur until the mask assembly 20 is actually engaged with the substrate during the fine alignment step. *See*, Boudreau column 5, lines 39-44 (indicating that the design allows enough forced movement of the mask about its primary datum reference location that the secondary datum can be used to make a more precise final registration of the mask).

In sharp contrast, the plurality of deposition masks of this invention are aligned relative to the base plate prior to engagement with the substrate. Processes for aligning the deposition masks relative to the base plate are described in detail in the specification at page 17, line 4 through page 19, line 6; page 21, line 6 through page 22, line 24; and page 24, line 20 through page 26, line 16. As described in these passages, the plurality of deposition masks of this invention are individually aligned relative to the base plate during fabrication of the integrated mask, before the masks are engaged with the substrate. Therefore, the step of aligning the plurality of deposition masks relative to the base plate prior to engagement with the substrate differentiates the invention from Boudreau.

In addition, it would not have been obvious to modify Boudreau (or combine it with another reference of record) to include such a step because alignment of the masks prior to engagement with the substrate would defeat the very purpose of Boudreau. In essence, Boudreau attempts to simplify the process of aligning a mask with a substrate by providing rough and fine alignment datum pins that engage the substrate carrier directly with the mask holder or mask assembly, respectively. Thus, alignment of the Boudreau mask must occur during engagement of the mask with the substrate. There is no suggestion to combine the Boudreau method with a process that aligns a deposition mask prior to engagement with a substrate; and any attempt to do so would run counter to the very operating principle of Boudreau. Therefore, the claimed

method is neither anticipated nor rendered obvious by Boudreau, whether taken alone or in combination with the other references of record. As discussed below, claim 11 has been amended to more clearly define the step of aligning the plurality of deposition masks prior to engaging the masks with a substrate.

Another distinction between this invention and Boudreau relates to the manner in which the deposition masks are aligned. Boudreau does not describe the individual alignment of two separate mask assemblies. Although Boudreau describes the substrate carrier as holding two substrates, only one mask assembly is shown in Fig. 1 and only one mask is described in connection with the figure. If two masks were provided in the mask holder 12, it is clear that both would be aligned together during the Boudreau rough alignment step, because rough alignment is performed between the entire mask holder 12 and substrate carrier 30.

With respect to the Boudreau fine alignment step, Fig. 2 appears to show two mask assemblies. However, the interface between the mask assemblies is obscured from view by the frame center support 16. Based on a detailed review of Boudreau, if two mask assemblies 20 were engaged with the mask holder 12, one cannot determine if the mask assemblies would be connected or abutting one another (similar to Clark, discussed below), or if there would be space for individual alignment between them. Based on the positioning of the two centrally disposed secondary datum pins 36 in Fig. 1, it appears that if two mask assemblies 20 were provided, they would be very close, overlapping or abutting one another. Given a fair reading of the disclosure of Boudreau, with special attention paid to the fine alignment mechanism, one skilled in the art would find no suggestion to independently align two masks during the fine alignment step. Instead, both masks would be aligned in unison. As such, if two mask assemblies 20 were provided, they would not appear to be independently aligned during either the rough or fine alignment steps.

In sharp contrast, the integrated mask of this invention comprises a plurality of deposition masks that are spatially separated from one another. *See, e.g.*, Figs. 1-4, page 14, lines 23-25. Each of the deposition masks is disposed over its own dedicated opening in the base plate and each can be aligned relative to the base plate independently of the other deposition masks. The independent alignment of each deposition mask is described in detail in the passages of the specification cited above in connection with the time at which the alignment step occurs. Just as Boudreau fails to describe the alignment of deposition masks prior to engaging the masks with the substrate, Boudreau also fails to describe or suggest the independent alignment of a plurality of masks.

Claim 11 has been amended to more clearly describe the features discussed above. Specifically, step (a-3) has been amended to recite that the position of each deposition mask can be adjusted relative to the base plate independently of the other deposition masks. In addition, step (a-6) has been amended to make more clear that the alignment of the relative position of each of the deposition masks relative to the base plate is performed prior to engaging the integrated mask with the substrate.

As discussed above, Boudreau does not describe or suggest the independent alignment of each of a plurality of deposition masks relative to a base plate. In addition, Boudreau does not describe or suggest the step of adjusting the relative position between the base plate and each of the deposition masks prior to engaging the mask holder with the substrate. For at least these reasons, Claim 11 and its dependent Claims 12-14 are patentable thereover. Because Tang and Duggal fail to remedy the deficiencies of Boudreau, these claims are also patentable over the cited combination.

Dependent Claims 12 and 13 have also been rejected over the combination of Clark, Tang and Duggal. Clark shows a stitched mask for producing OLED devices. The mask

includes four mask segments 12a-12d which are secured together to form a large deposition mask 12. *See*, column 3, lines 50-52; column 4, lines 34-35. Thus, the mask segments 12a-12d are not alignable independently of one another. Because each of claims 12 and 13 are dependent on claim 11 (and include the feature of independent alignment of the masks), claims 12 and 13 are patentable over Clark.

Also, the mask segments 12a-12d of Clark are not arranged respectively over a plurality of openings in the frame 22. Instead, the combined deposition mask 12 is positioned over a single opening 24. As clearly shown in Fig. 1, the Clark deposition mask 12 is not positioned over the peripheral openings 26. Thus, Clark does not describe or suggest a plurality of openings in a base plate on which the deposition masks are respectively arranged, as recited in independent claim 11. For this reason also, dependent claims 12 and 13 are patentable thereover. Because Tang and Duggal also do not remedy the deficiencies of Clark with respect to the features discussed above, it is respectively submitted that Claims 12 and 13 are also patentable over the cited combination.

Therefore, it is respectfully requested that all of the objections and rejections set forth in the Official Action be reconsidered and withdrawn. It is believed that the entire application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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